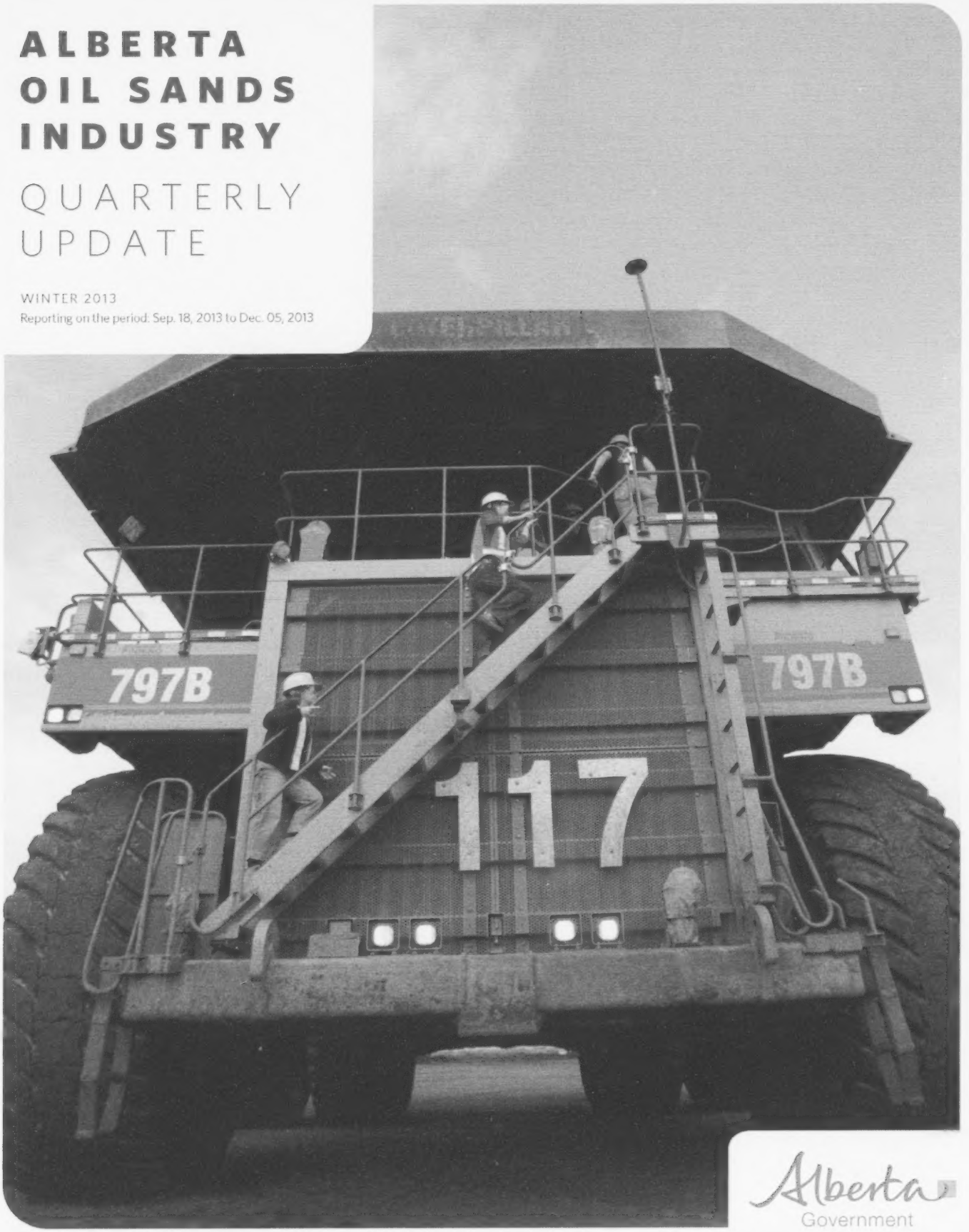
ALBERTA OIL SANDS INDUSTRY

QUARTERLY UPDATE

WINTER 2013

Reporting on the period: Sep. 18, 2013 to Dec. 05, 2013



Alberta Government

All about the oil sands

Background of an important global resource

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Canada has the third-largest oil reserves in the world, after Saudi Arabia and Venezuela. Of Canada's 173 billion barrels of oil reserves, 170 billion barrels are located in Alberta, and about 168 billion barrels are recoverable from bitumen. This is a resource that has been developed for decades but is now gaining increased global attention as conventional supplies—so-called "easy" oil—continue to be depleted. The figure of 168 billion barrels of bitumen represents what is considered economically recoverable with today's technology, but with new technologies, this reserve estimate could be significantly increased. In fact, total oil sands reserves in place are estimated at 1.8 trillion barrels.

There are three major bitumen (or oil sands) deposits in Alberta. The largest is the Athabasca deposit, which is located in the province's northeast in the Regional Municipality of Wood Buffalo. The main population centre of the Athabasca deposit is Fort McMurray. The second-largest oil sands deposit is referred to as Cold Lake, just south of Athabasca, with the main population centre the City of Cold Lake. The smallest oil sands deposit is known as Peace River, which is located in northwest-central Alberta. A fourth deposit called Wabasca links to the Athabasca and is generally lumped in with that area.

The existence of bitumen in Alberta has been known for a long time. The first mention of it in Canadian history was in 1719, when a Cree named Wapasu brought a sample of the "gum" to a Hudson's Bay trading post. First Nations in what is now the Wood Buffalo area had traditionally used the bitumen, which seeps from outcrops along the Athabasca River, to waterproof their canoes.

For the first time in 2012, in situ oil sands production exceeded mined oil sands production in Alberta. In 2012, 52 per cent of the province's oil sands volumes were produced using in situ methods. Alberta will continue to rely to a greater extent on in situ production in the future, as 80 per cent of the province's proven bitumen reserves are too deep underground to recover using mining methods.

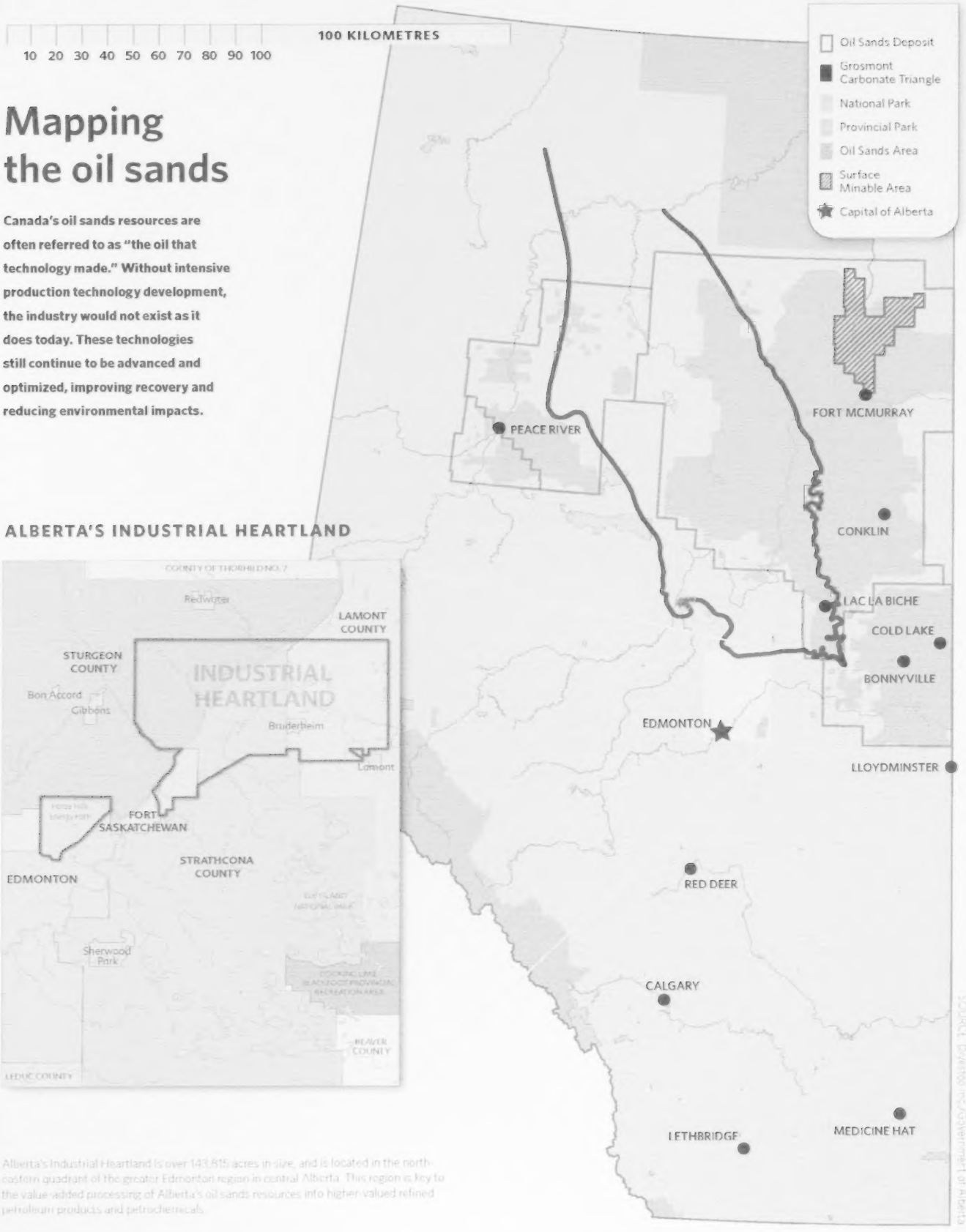
There are essentially two commercial methods of in situ (Latin for "in place," essentially meaning wells are used rather than trucks and shovels). In cyclic steam stimulation (CSS), high-pressure steam is injected into directional wells drilled from pads for a period of time, then the steam is left to soak in the reservoir for a period, melting the bitumen, and then the same wells are switched into production mode, bringing the bitumen to the surface.

In steam assisted gravity drainage (SAGD), parallel horizontal well pairs are drilled from well pads at the surface. One is drilled near the top of the target reservoir, while the other is drilled near its bottom. Steam is injected into the top well, a steam chamber forms, and the melted bitumen flows into the lower well via gravity and is pumped to the surface using artificial lift.

Both SAGD and CSS are used in the Cold Lake and Peace River deposits, while SAGD is the in situ technology of choice in the Athabasca deposit. The selection is based on a number of factors, including geology. The technologies combined currently produce just over one million barrels per day.

Research is underway on a number of other production technologies designed to optimize production, including variations on solvent-assisted SAGD and CSS, recovery using electricity and in situ combustion.

Bitumen that has not been processed, or "upgraded," can be used directly as asphalt. It must be diluted to travel by pipeline. Adding value, some producers upgrade their product into synthetic crude oil, which is a refinery feedstock. That can be transformed into transportation fuels and other products. ■



Mapping the oil sands

Canada's oil sands resources are often referred to as "the oil that technology made." Without intensive production technology development, the industry would not exist as it does today. These technologies still continue to be advanced and optimized, improving recovery and reducing environmental impacts.

Alberta's Industrial Heartland is over 143,815 acres in size, and is located in the north-eastern quadrant of the greater Edmonton region in central Alberta. This region is key to the value-added processing of Alberta's oil sands resources into higher-valued refined petroleum products and petrochemicals.

SOURCE: Data is ©Government of Alberta

GOVERNMENT UPDATE

ALBERTA AND BRITISH COLUMBIA REACH AGREEMENT ON OPENING NEW MARKETS

Alberta Premier Alison Redford and B.C. Premier Christy Clark announced in November a framework agreement between the two provinces on moving energy resources to new markets.

"A key part of our Building Alberta Plan is getting Alberta's resources to new markets at much fairer prices so we can keep funding the programs Albertans told us matter most to them," said Redford. "[This] agreement with B.C. is good news for Alberta, for British Columbia and for all Canadians. I welcome Premier Clark's endorsement of the Canadian Energy Strategy and our shared commitment to create jobs, long-term growth and position Canada as a true global energy superpower. We look forward to continued constructive dialogue with B.C."

The framework will also see the Government of British Columbia endorse Premier Redford's Canadian Energy Strategy.

"Agreement on B.C.'s five conditions is a necessary first step before any [pipeline] proposals can be considered for approval. It is the way we do business in B.C., and it works," said Clark. "By working together with Alberta through these principles, we can grow our economies and strengthen Canada's economy overall."

The governments of B.C. and Alberta agree that British Columbia's conditions are intended to ensure both the responsible production of energy as well as its safe transport to new markets, giving projects the social licence to proceed.

Conditions one to four are designed to achieve both economic benefit and risk mitigation on increased shipments through British Columbia. They mirror Alberta's legislated commitments on responsible energy production. Alberta and British Columbia agree that only through intensive environmental review and protection, enhanced marine safeguards and First Nations support can projects proceed.

On condition five, Alberta agrees that British Columbia has a right to negotiate with industry on appropriate economic benefits. Both governments agree it is not for the governments of Alberta and British Columbia to negotiate these benefits. Both provinces reaffirmed that Alberta's royalties are not on the table for negotiation.

ALBERTA FORTIFIES ENERGY RELATIONSHIPS WITH ASIA

Alberta and China signed an agreement in October to increase energy trade and collaboration between the two jurisdictions.

The historic Framework Agreement on Sustainable Energy Development, signed by Alberta Energy Minister Ken Hughes and China's national energy administration chief Wu Xinxiong, is a framework that seeks to set out concrete actions to strengthen trade ties.

This non-binding intergovernmental agreement is the first of its kind between the Chinese central government and a sub-national government of Canada. It's aligned with the existing Natural Resources Canada and National Energy Administration agreement.

Chinese President Xi Jinping and Canadian Governor General David Johnston also attended the signing in the Great Hall of the People in Beijing, signalling the significance of Alberta and China's future energy trade and collaboration.

BILL CREATES ENVIRONMENTAL MONITORING AGENCY

An arm's-length agency will oversee environmental monitoring in Alberta.

Diana McQueen, Minister of Environment and Sustainable Resource Development, introduced Bill 31 in the Alberta Legislature in October. The Protecting Alberta's Environment Act creates the new Alberta Environmental Monitoring, Evaluation and Reporting Agency (AEMERA), responsible for operating a comprehensive, science-based monitoring system.

Initially, the arm's length agency will be responsible for work currently done in the oil sands area under the Joint Oil Sands Monitoring plan. Eventually, AEMERA will be responsible for province-wide environmental monitoring, evaluation and reporting as land use plans are implemented.

The work of this agency will provide the best possible data that will be used to make the best possible decisions when it comes to responsible development of the province's natural resources. This data will detail the condition of Alberta's environment, specifically air, land, water and biodiversity.

Over the coming weeks, the Alberta government will appoint an agency chair and board members through a public application process. AEMERA is expected to start operating in early 2014.

NEW ACT HELPS ALBERTA REACH ENERGY POTENTIAL

The Alberta government is proposing legislation that will help Albertans get better prices for their energy resources.

The Building New Petroleum Markets Act will boost the government's ability to respond more quickly to changing

market conditions and empower it to proactively seek out opportunities for Alberta's energy products. The legislation allows the Minister of Energy to set the strategic priorities of the Alberta Petroleum Marketing Commission (APMC).

The APMC is responsible for selling the conventional oil that government receives in lieu of cash royalties and for implementing the Bitumen Royalty-In-Kind policy.

The proposed Building New Petroleum Markets Act will:

- Allow the Minister of Energy to provide specific direction to the APMC, based on the public interest and government priorities;
- Modernize and improve the corporate rules under which the APMC currently operates, including giving the government the ability to appoint a board of up to seven directors instead of the current three, including expertise from outside the public service; and
- Clarify financial tools available to the APMC, which could include providing loans or making equity investments in projects, when authorized by the government.

MINISTER DALLAS WELCOMES STUDY ON PROPOSED EUROPEAN UNION FUEL QUALITY DIRECTIVE

Minister of International and Intergovernmental Relations Cal Dallas issued the following statement in response to the release of a study by ICF International, Inc. on the proposed European Union (EU) Fuel Quality Directive (FQD).

"This study confirms our contention that the FQD unfairly and unjustifiably discriminates against Alberta's oil sands, because it is based on a flawed and unscientific premise and poor data.

"The study shows that many of the crude oils being imported and refined in the EU today actually have greater GHG [greenhouse gas] intensities than oil sands crude. Yet these crudes are categorized in the FQD as lower intensity. Not only is this unfair, it is likely to result in higher GHG emissions in the EU, which is exactly the opposite of what the policy is purported to achieve.

"Our government agrees with the need to reduce greenhouse gas emissions. Any efforts to do so must be fair and effective, and be based on sound logic and science—a message Minister [of Environment and Sustainable Resource Development Diana] McQueen and I reinforced in meetings with EU member states during a mission to Europe earlier this fall.

"If the European Union is serious about reducing greenhouse gas emissions, then the FQD needs to apply the same standard to all crude oils and reflect the true emissions intensities of each."

NATIONAL ENERGY BOARD REPORT HIGHLIGHTS AMPLE ENERGY SUPPLY

The National Energy Board (NEB) released in November its report *Canada's Energy Future 2013: Energy Supply and Demand Projections to 2035* (EF 2013).

The results indicate there will be enough supply to meet Canada's growing energy needs for the foreseeable future. In fact, over the next 20 years, the NEB projects energy production levels to exceed domestic requirements, resulting in growing amounts of energy available for export.

"Canada has vast energy resources—more than enough to meet Canada's growing energy demand," said Gaetan Caron, chairman and chief executive officer of the NEB. "Canada also has one of the highest standards of living in the world, in part due to our energy resources, which are a key driver of the economy."

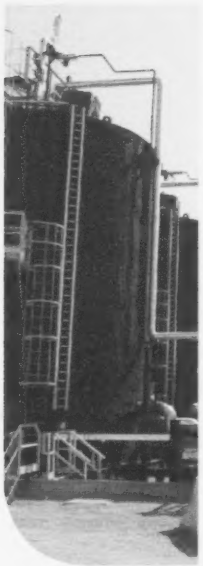
Total Canadian energy production will grow substantially between now and 2035, with oil leading the way. Oil production increases by 75 per cent. Natural gas production increases by 25 per cent. Canadian total electricity generation and supply increases over the projection period as well. Natural gas-fired power generation capacity increases substantially, largely at the expense of coal-fired capacity, and non-hydro renewable capacity doubles its share of the capacity mix.

Canadian energy needs increase as well, but at a slower rate than the historical trend. Canadian demand for oil and natural gas increases by 28 per cent, with hydrocarbons continuing to be the primary source of energy to heat homes and businesses, transport people and goods, and many other functions that are integral to Canadians' standard of living.

Improvements in energy efficiency will mean Canadians will be using less energy in the future to produce more. By 2035, the energy used per unit of economic output is projected to be 20 per cent lower than current levels. As a result of new passenger vehicle emission standards, EF 2013 also reports the reversal of the long-term upward trend in passenger transportation energy use.

Growth in export markets and the infrastructure to access them are key uncertainties in this report's projections. ■

LABOUR UPDATE



LABOUR MARKET INFORMATION

Alberta's seasonally adjusted unemployment rate was 4.4 per cent in October 2013, down 0.4 percentage points from August and unchanged from the same month last year. This rate was the second lowest in Canada, behind Saskatchewan's 3.6 per cent. The national rate was 6.9 per cent, unchanged from the previous month.

Alberta continues to lead the nation in economic growth thanks largely to investment in oil sands projects. The province led quarterly employment growth across Canada, gaining 33,800 jobs on a seasonally adjusted basis. What's more, the province hasn't seen employment growth in this range since 2011. On a year-over-year basis, employment grew by 3.5 per cent or 74,400 jobs from 2012, whereas national job creation was up by a modest 1.3 per cent.

An influx of new migrants has added to the supply of labour in the province and prevented the unemployment rate from falling significantly during a period of robust job growth. In four of the last five months, employment has jumped by more than 14,000 per month.

Yet, this surge in job growth has been closely matched by entry into the labour force, as growing numbers of people look for work. As a result, despite strong monthly job gains, the unemployment rate has stayed within the 4.2 per cent to five per cent range since last spring.

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CHANGES TO THE ALBERTA IMMIGRANT NOMINEE PROGRAM

The Alberta Immigrant Nominee Program (AINP) has made an important change to the eligibility criteria of the Strategic Recruitment Stream - Post-Graduate Worker Category. Effective immediately, only applicants who have completed an eligible program of study in Alberta may apply under this category.

See the Post-Graduate Worker Category page for details.

CHANGES TO THE CANADIAN EXPERIENCE CLASS

Citizenship and Immigration Canada implemented several changes to the Canadian Experience Class (CEC). As part of the changes, an annual cap on the number of new CEC applications and several sub-caps specific to certain occupations have been introduced.

See the Citizenship and Immigration Canada news page for more information.

INTERNATIONAL MARKET FACT SHEETS

Are you recruiting internationally but have no idea where to start? Recruiting fact sheets for the United States and Ireland provide information on the labour supply, migration trends, credential recognition and recruitment tips to help you make informed recruitment decisions.

Contact Us:
If you have questions, concerns or require more information, contact us at ABWorkforceinfo@gov.ab.ca ■

What's new in the oil sands

BUSINESS

■ Suncor Energy Inc. and its partners have given a unanimous go-ahead for the long-planned Fort Hills oil sands mine, which is expected to produce 180,000 barrels of bitumen per day with start-up scheduled for the fourth quarter of 2017.

The go-forward capital investment in Fort Hills is estimated at approximately $13.5 billion and is expected to account for approximately 15 per cent of Suncor's total capital budget on average per year.

■ The estimated cost of the Sturgeon Refinery, which will convert some of Alberta's royalty bitumen into diesel fuel, has ballooned to $8.5 billion from the $5.7 billion price tag cited when the project was sanctioned a year ago.

And project owners North West Upgrading Inc. and Canadian Natural Resources Limited have delayed their target for starting commercial operations at the 50,000-barrel-per-day facility to September 2017 from the original forecast of mid-2016.

The partners attribute the increased estimate to a combination of cost inflation and the inability to fully capture certain cost savings initiatives.

■ Canadian Natural Resources Limited says it completed several key milestones in the third quarter in the expansion of its integrated Horizon oil sands mine and upgrader.

Overall, Horizon Phase 2/3 construction—targeted to increase production capacity to 250,000 barrels per day of synthetic crude oil (SCO)—reached approximately 30 per cent of physical completion. Current costs continue to trend slightly below sanctioned cost estimates.

The Reliability phase is approximately 91 per cent physically complete. Phase 2A, which will add 10,000 barrels per day of additional SCO production, is approximately 70 per cent physically complete and on schedule for completion in 2015. Phase 2B, which will add 45,000 barrels per day of SCO in 2016, is approximately 20 per cent physically complete. Phase 3—the addition of 80,000 barrels per day of SCO in 2017—is approximately 19 per cent physically complete.

■ Royal Dutch Shell plc is proceeding with its Carmon Creek thermal project in the Peace River oil sands region, which is expected to produce up to 80,000 barrels of oil per day.

Shell submitted its regulatory application for Carmon Creek in 2010 and received approval from the Alberta Energy Regulator in April 2013. First oil is planned for mid-2017. Full production capacity is expected two years later.

■ Prosper Petroleum Ltd. has applied to the Alberta Energy Regulator to build and operate the $390-million Rigel oil sands project, a proposed steam assisted gravity drainage (SAGD) operation about 100 kilometres northwest of Fort McMurray.

The private, Calgary-based company will operate the 10,000-barrel-per-day project. Its partner, Calgary's PetroLama Namur Oil Sands Exploration, is owned by Czech Republic-based LAMA Energy Group s.r.o. Assuming regulatory approval and favourable market conditions, construction is scheduled to begin in late 2015, with first oil in early 2017.

■ The first commercial project in Canada intended to tap the vast deposits of bitumen in carbonate formations has been delayed by about a year due to a need for more financing.

Start up of the Saleski commercial development in northern Alberta is now scheduled for the third quarter of 2016 instead of the third quarter of 2015, Laricina Energy Ltd. says. The company has been operating a pilot at Saleski since 2010 and has reported encouraging results.

■ TransCanada Corporation now expects to file an application in the first half of 2014 for its Energy East Pipeline to transport western Canadian crude to Saint John, N.B.

Although TransCanada earlier had talked about a filing in the first quarter, the company says it needs additional time to deal with more facilities and work with stakeholders before it submits the application to convert a segment of its Canadian Mainline to crude service. A strong response from shippers prompted the company to add a second marine export terminal and increase the size of the project to 1.1 million barrels per day from 800,000 barrels per day.

■ Canadian Natural Resources Limited says that first steam has been achieved at its 100 per cent owned and operated Kirby South SAGD project.

Kirby South is targeted to grow to approximately 40,000 barrels per day by the end of 2014 and is the first step in a staged expansion plan for the greater Kirby area, targeted to increase Kirby area production over time to approximately 140,000 barrels per day.

■ Savanna Energy Services Corp. and Fort McKay First Nation have agreed to form Fort McKay-Savanna Energy Services LP.

The jointly owned company will provide a range of services to the oil sands sector, including drilling, coring and well servicing, in addition to offering equipment rentals in the Regional Municipality of Wood Buffalo area. ■

What's new in the oil sands

TECHNOLOGY

■ Royal Dutch Shell plc's newly sanctioned 80,000-barrel-per-day Carmon Creek thermal project has been designed to be both commercially viable and minimize environmental impacts, the company says. This design includes a novel well-delivery system and 650 megawatts of cogeneration—500 megawatts of which will likely be sold back to the grid. Once the project is up and running, the aim is to virtually eliminate the use of freshwater in steam generation by recycling water produced with the oil.

Shell says it is taking a well manufacturing approach to drill and complete the wells using the Sirius Well Manufacturing Services joint venture. This approach is based on standardization of components, which allows quicker and repeatable operations that provide opportunities to reduce costs.

■ Canada's Oil Sands Innovation Alliance (COSIA) has updated its stakeholders and the public on its performance since inception almost two years ago.

COSIA and its 13 member companies have collectively created new legal agreements that allow member companies to collaborate at unprecedented levels and developed planning frameworks for each of COSIA's Environmental Priority Areas (EPAs) that allow companies to identify new projects best able to deliver environmental performance improvement.

To date, COSIA's member companies have shared 560 technologies worth a total of $900 million. Its member companies are now actively working on 185 joint industry projects worth $500 million across COSIA's four EPAs—land, water, tailings and greenhouses gasses.

■ First production has been achieved at a hydrogen pilot plant in Fort Saskatchewan, Alta.

Operated by Western Hydrogen Ltd., the plant uses a process called molten salt gasification (MSG) to produce hydrogen. Unlike the current hydrogen production method of steam methane reforming, MSG can produce hydrogen from not only natural gas, but also other feedstocks, including renewables.

"As a key ingredient to convert oil sands bitumen into synthetic crude, hydrogen is an important component to Canada's sustainable and prosperous future," says Vicky Sharpe, president and chief executive officer of Sustainable Development Technology Canada, one of the project funders. "The innovative MSG technology reduces the overall footprint of oil sands production, something producers are striving for and consumers and export markets are increasingly demanding."

The company says it will begin to accelerate the development and commercialization of the technology, and is currently in talks with current and prospective partners.

■ Industry in the Athabasca oil sands region will now have access to a database of wildlife species habitats in the area.

The Cumulative Environmental Management Association (CEMA) built the database out of habitat models used in environmental impact assessments (EIAs), supplementary information requests and closure planning phases on oil sands projects dating back to 1990.

The organization says the project was initiated to address uncertainty surrounding validated and unvalidated habitat models used in EIAs and other documents. It draws upon a study completed by CEMA's wildlife task group in 2011, which looked at synthesizing habitat models used in the region.

"Twenty-two oil sands operations EIAs and 228 species habitat models in the EIA documents were reviewed, and the results have been compiled into this new database that will assist those operating and living in the oil sands region," says Lorne Gould, chair of the wildlife task group at CEMA.

The database is available on CEMA's website at cemaonline.ca.

■ CO_2 Solutions Inc. says it has demonstrated that its patented enzyme-enabled carbon-capture technology uses at least one-third less energy than existing methods and can withstand the rigours of industrial application.

The company, based in Quebec City, will now proceed to the large-bench scale testing phase of one-half tonne per day of CO_2 capture wherein the same performance metrics will be validated under flue gas conditions.

Following successful large-bench validation, the project will move to field pilot-scale testing (approximately 15 tonnes per day of CO_2 capture) in 2014.

The company says its testing captured 90 per cent of the CO_2 emissions from natural gas combustion at a typical in situ oil sands operation.

The 33 per cent reduction was achieved without any process optimization, and further savings are expected upon optimization and operational integration in later phases, CO_2 Solutions says.

■ GE Canada is partnering with Canada's Oil Sands Innovation Alliance (COSIA) to focus on reducing greenhouse gas emissions and water consumption in the oil sands.

The joint projects will be based out of GE's Global Heavy Oil Centre of Excellence in Calgary. In order to support the initiative, the company says it will be hiring up to 15 process and solution engineers at the facility.

Details on the projects will be released in the coming months.■

OIL SANDS PROJECT TECHNOLOGY GUIDE

CSS—CYCLIC STEAM STIMULATION

CSS involves injecting high-pressure steam into the reservoir for several weeks, followed by several weeks where the reservoir is left to "soak." The heat softens the bitumen and the water dilutes and separates the bitumen from the sand. The pressure creates cracks and openings through which the bitumen can flow back into the steam injector wells, which are converted to production mode.

ET-DSP—ELECTRO-THERMAL DYNAMIC STRIPPING *(EMERGING)*

ET-DSP combines the majority of the dominant heat transfer mechanisms to heat and mobilize bitumen in situ. Electrodes are placed in a grid configuration and a production well is located within the centre of each series of electrode wells. The technology has been commercially applied for soil remediation and is expected to reduce greenhouse gas emissions and water use.

N-SOLV *(EMERGING)*

N-Solv involves the injection of pure, heated solvent vapour into an oil sands reservoir where it condenses, delivering heat to the reservoir and subsequently dissolving the bitumen, with the resulting miscible liquids flowing by gravity to a production well. It is designed to accelerate extraction rates and reduce greenhouse gas emissions.

PRIMARY PRODUCTION—COLD HEAVY OIL PRODUCTION WITH SAND

Cold heavy oil production with sand (CHOPS) is a non-thermal in situ primary production technology that involves the continuous production of sand using progressing cavity pumps to enhance recovery.

SAGD—STEAM ASSISTED GRAVITY DRAINAGE

SAGD employs two parallel horizontal wells: one injection well near the top of the reservoir, through which high-pressure steam is continuously injected, and one production well near the bottom of the reservoir into which the softened bitumen continuously flows and can be pumped to the surface. SAGD surface facilities include steam generation, water processing and bitumen treatment. Multiple operators are also now working with solvent co-injection in SAGD to increase recovery and reduce natural gas and water requirements.

SURFACE MINING

Trucks take oil sand to crushers where it is prepared for extraction. Crushed oil sand is mixed with warm water and fed through a hydro-transport system to an extraction plant where the mixture of oil, sand and water is placed in separation vessels. Injected air forms tiny bubbles that separate bitumen from the sand and floats it to the tank surface where it forms a thick froth that is skimmed off, mixed with naphtha and spun in a centrifuge to remove the remaining solids, water and dissolved salts. The cleaned sand and the water are then sent to the tailings area where the water is recycled back to the extraction process.

TAGD—THERMAL ASSISTED GRAVITY DRAINAGE *(EMERGING)*

TAGD is a process being developed for the in situ recovery of bitumen from carbonate formations. TAGD uses an array of downhole heaters installed in horizontal wells to heat the reservoir via thermal conduction.

THAI—TOE TO HEEL AIR INJECTION *(EMERGING)*

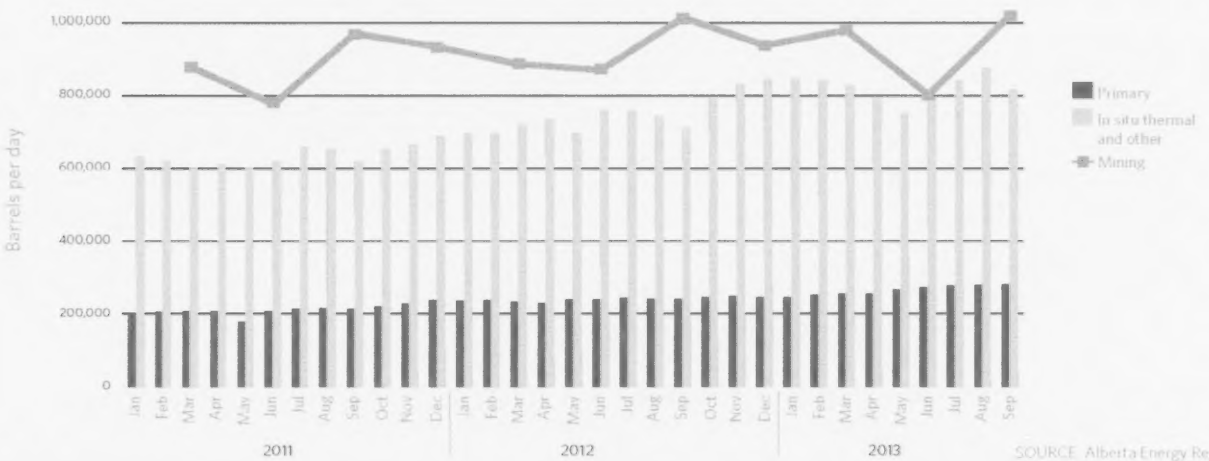
THAI uses a vertical air injection well with a horizontal production well. Rather than steam, THAI technology injects air and then relies on underground combustion of a portion of the oil in the ground to generate the heat required to melt the remainder of the bitumen and allow it to flow into the production well. The process is intended to reduce greenhouse gas emissions and water use.

UPGRADING

Once bitumen is produced, it is sent for further upgrading, a process that breaks down the heavy carbon molecules and converts it into a product similar to conventional crude oil. This can be processed by refiners into value-added products.

SOURCE: Oil Sands Developers Group/*Oilsands Review*

Alberta Oil Sands Production by Extraction Method



SOURCE: Alberta Energy Regulator

Project listings

Updated status of oil sands projects in Alberta As of December 2013

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS
NORTH ATHABASCA REGION — MINING			
CANADIAN NATURAL RESOURCES LIMITED			
Horizon			
Canadian Natural says that operating performance at Horizon has been strong since the company executed its first major turnaround in May 2013. Horizon SCO production in the third quarter was approximately 112,000 barrels per day. The overall phased expansion to 250,000 barrels per day is 30 per cent physically complete, with the first phase in that expansion, Reliability, 51 per cent physically complete and five per cent under budget.			
Phase 1	135,000	2009	Operating
Reliability – Tranche 2	5,000	2014	Construction
Phase 2A	10,000	2015	Construction
Phase 2B	45,000	2016	Construction
Phase 3	80,000	2017	Construction
IMPERIAL OIL LIMITED			
Kearl			
Imperial Oil says that all three paraffinic froth treatment trains are operational and have been tested at design capacity. Diluted bitumen has been successfully run in three Imperial and ExxonMobil refineries, and, in the fourth quarter, sales to unrelated parties commenced. Full capacity is expected to be reached before the end of 2013. The second phase of Kearl is about 58 per cent complete.			
Phase 1	110,000	2013	Operating
Phase 2	110,000	2015	Construction
Phase 3	80,000	2020	Approved
Phase 4 Debottleneck	45,000	TBD	Approved
SHELL ALBIAN SANDS			
Jackpine			
The federal joint review panel has issued conditional approval despite "significant" environmental impacts. Now the project will go through the Alberta regulatory process and obtain approval from the federal environment minister.			
Phase 1A	100,000	2010	Operating
Phase 1B	100,000	TBD	Approved
Expansion	100,000	2017	Approved
Muskeg River			
Minority partner Marathon Oil Corporation says the Athabasca Oil Sands Project has recently shown "outstanding" performance due to robust reliability and realizations, but is expecting significant planned downtime in the fourth quarter.			
Commercial	155,000	2002	Operating
Expansion & Debottlenecking	115,000	TBD	Approved
Pierre River			
A joint review panel of the Canadian Environmental Assessment Agency and Alberta Energy Regulator has commenced a public comment period on additional information provided by Shell, following questions stemming from the last public comment period. Comments are due to the panel by Jan. 17, 2014.			
Phase 1	100,000	2018	Application
Phase 2	100,000	TBD	Application
SUNCOR ENERGY INC.			
Base Operations			
Suncor says that production was reduced in September as a result of planned maintenance at the Upgrader 2 vacuum tower and related units, which was successfully completed in October. Suncor says this marks the completion of major planned maintenance activit – for the year and sets the foundation for a strong fourth quarter.			
Millennium Mine	294,000	1967	Operating
Steepbank Debottleneck Phase	4,000	2007	Operating
Millennium Debottlenecking	23,000	2008	Operating
North Steepbank Extension	180,000	2012	Operating
Fort Hills			
Suncor and its partners have sanctioned the Fort Hills project.			
Phase 1	180,000	2017	Construction
Debottleneck	20,000	TBD	Approved
Voyageur South			
Suncor considers Voyageur South to be a "longer-term" project and has not confirmed a start-up date.			
Phase 1	120,000	TBD	Application
SYNCRUDE CANADA LTD.			
Mildred Lake/Aurora			
The proposed terms of reference for Syncrude's Mildred Lake Extension (MLX) project are now available for public comment until November 1 here: http://environment.alberta.ca/02313.html.			
Base Mine Stage 1 & 2 Expansion	290,700	1978	Operating
Stage 3 Expansion	116,300	2006	Operating
Aurora South Train 1	100,000	2016	Approved
Aurora South Train 2	100,000	2018	Approved
Mildred Lake Mine Extension (MLX)	TBD	2023	Announced
TECK RESOURCES LIMITED			
Frontier			
The Canadian Environmental Assessment Agency estimates the federal review schedule for the project application to be approximately two years, so 2015 would be the earliest approval would be granted. Teck expects to have a project update available in the fourth quarter w			
Phase 1	74,600	2021	Application
Phase 2	84,000	2024	Application
Phase 3	79,300	2027	Application
Phase 4 Equinox	39,400	2030	Application
TOTAL E&P CANADA LTD.			
Joslyn North Mine			
Project partner Suncor Energy Inc. says an updated timing for the Joslyn sanction decision will be made available when it is ready.			
Phase 1	100,000	2021	Approved
NORTH ATHABASCA REGION — IN SITU			
ATHABASCA OIL CORPORATION			
Birch			
Athabasca says its work at Birch currently relates to regulatory compliance and preliminary engineering on future site access infrastructure. The company is currently reviewing the optimal size of the first project.			
Phase 1	12,000	TBD	Announced
Dover West Carbonates (Leduc)			
A fourth production cycle for the TAGD pilot test is scheduled for the fourth quarter of 2013. Athabasca had been encouraged by results so far.			
Phase 1 Demonstration	6,000	2016	Approved
Phase 2 Demonstration	6,000	TBD	Application
Dover West Sands & Clastics			
Athabasca Oil is currently awaiting regulatory approval for the Dover West Sands Phase 1.			
Phase 1	12,000	2016	Application
Phase 2	35,000	2019	Announced
Phase 3	35,000	2020	Announced
Phase 4	35,000	2022	Announced
Phase 5	35,000	2024	Announced
BP P.L.C.			
Terre de Grace			
BP says that ongoing appraisal activities include delineation drilling, seismic acquisition and appraisal of water sources.			
Pilot	10,000	TBD	Approved
BRION ENERGY CORPORATION			
Dover			
The Fort McKay First Nation has been granted leave to appeal the recently granted regulatory approval of the Dover project, based on the First Nation's desire to have a buffer zone installed between the project and land used for traditional purposes.			
Dover North Phase 1	50,000	2016	Approved
Dover North Phase 2	50,000	2018	Approved
Dover South Phase 3	50,000	2021	Approved
Dover South Phase 4	50,000	2023	Approved
Dover South Phase 5	50,000	2025	Approved
MacKay River			
Brion Energy says the first phase of the project's detailed engineering is 84 per cent complete, drilling is 48 per cent done, procurement is at 55 per cent and 34 per cent of construction has been finished. The main access road, shared with Southern Pacific Resources Corp., has been completed.			
Phase 1	35,000	2015	Construction
Phase 2	40,000	2018	Approved
Phase 3	40,000	2020	Approved
Phase 4	35,000	2022	Approved
CANADIAN NATURAL RESOURCES LIMITED			
Birch Mountain			
Canadian Natural says Birch is in the planning stages.			
Phase 1	60,000	2019	Announced
Phase 2	60,000	2023	Announced

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS
CENOVUS ENERGY INC.			
East McMurray			
Cenovus says this project remains part of its portfolio of long-term development opportunities.			
Phase 1	30,000	TBD	Announced
Steepbank			
Cenovus says this project remains part of its portfolio of long-term development opportunities.			
Phase 1	30,000	TBD	Announced
Telephone Lake			
Cenovus says its dewatering pilot project designed to remove an underground layer of non-potable water sitting on top of the oilsands deposit at Telephone Lake has been running successfully and has removed approximately 65 per cent of the top water, replacing it with air. The company plans to complete the pilot imminently.			
Phase A	45,000	TBD	Application
Phase B	45,000	TBD	Application
E-T ENERGY LTD.			
Poplar Creek			
E-T Energy recently held an auction, auctioning off its complete $12-million heavy oil extraction and processing facility. The company and its project is impacted by the Government of Alberta's decision to cancel several oilsands leases surrounding Fort McMurray, as well as the need to raise additional financing.			
Experimental Pilot	1,000	2012	Operating
Phase 1	10,000	TBD	Announced
Phase 2	40,000	TBD	Announced
GRIZZLY OIL SANDS ULC			
Thickwood			
Grizzly filed the regulatory application for the Thickwood project in December 2012.			
Phase 1	6,000	2017	Application
Phase 2	6,000	TBD	Application
HUSKY ENERGY INC.			
Saleski			
Husky filed the regulatory application for its Saleski pilot in early May 2013.			
Carbonate Pilot	3,000	2017	Application
Sunrise			
Husky says the first phase of Sunrise is approximately 80 per cent complete as it advances toward initial production in late 2014. In the third quarter, work continued on the central processing facility with all module fabrication completed and major equipment installed. Commissioning is underway for the first two of eight well pads, with the rest targeted for completion by the end of the year. Construction of the operations control centre is progressing as planned.			
Phase 1	60,000	2014	Construction
Phase 2A	70,000	2018	Approved
Phase 2B	70,000	2020	Approved
IMPERIAL OIL LIMITED			
Aspen			
Imperial Oil has filed the proposed terms of reference for the Aspen project's environmental impact assessment with Alberta Environment. Public review and comment will be accepted until October.			
Phase 1	45,000	TBD	Announced
Phase 2	45,000	TBD	Announced
Phase 3	45,000	TBD	Announced
IVANHOE ENERGY INC.			
Tamarack			
Ivanhoe Energy has received a letter of non-objection from the Mikisew Cree First Nation regarding the Tamarack project. The company says it has now successfully secured letters of non-objection from five of the seven stakeholders that filed statements of concern and continues efforts to resolve the final two statements of concern. Ivanhoe says it anticipates "regulatory clarity" by the end of 2013.			
Phase 1	20,000	2017	Application
Phase 2	20,000	TBD	Application
MARATHON OIL CORPORATION			
Birchwood			
Marathon filed its regulatory application in 2012. Regulatory approval and project sanctioning are expected in 2013.			
Demonstration	12,000	2017	Application
OAK POINT ENERGY LTD.			
Lewis			
The AER and Alberta Environment have approved Oak Point's Lewis project, which is estimated to cost $65 million.			
Pilot	1,720	TBD	Approved
PROSPER PETROLEUM LTD.			
Rigel			
Prosper Petroleum filed its regulatory application for the Rigel SAGD project in November 2013.			
Phase 1	10,000	2017	Application
SILVERWILLOW ENERGY CORPORATION			
Audet			
SilverWillow's engineering consultants have completed the preliminary engineering and cost estimate for Phase 1 of the proposed Audet SAGD project. The preliminary capital cost estimate for the project totals $550 million, implying a capital intensity of just under $46,000 per calendar day of bitumen production. SilverWillow is in the process of completing the required environmental studies and plans to submit a regulatory application for Phase 1 in the fourth quarter of 2013.			
Pilot	12,000	2016	Announced
SOUTHERN PACIFIC RESOURCE CORP.			
STP-McKay			
Southern Pacific says that average bitumen production at STP-McKay was 2,214 barrels per day for the month of October. After two months of making significant improvements on the well pairs, the company says it elected for most of October to hold existing rates on most wells, and ensure sub-cool levels were being adequately maintained. This also allowed operations staff a steady-state period to rebalance steam distribution and fluid withdrawal rates between the heel and toe sections of the well pairs. Workovers on three well pairs are currently underway to improve conformance, with more to come depending on results.			

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS
Phase 1	12,000	2012	Operating
Phase 1 Expansion	6,000	2016	Application
Phase 2A	12,000	2018	Application
Phase 2B	6,000	2018	Application
SUNCOR ENERGY INC.			
Dover			
N-Solv says hot oil is currently being circulated into the reservoir to open a path between the injection well and the producer well. Propane or butane injection on the solvent-only production pilot is expected to begin in the first quarter of 2014. Operations will continue until 2015.			
Demonstration Plant	500	2013	Construction
Firebag			
Suncor says that bitumen production at Firebag continued to ramp up in the third quarter and increased 35 per cent over the prior-year quarter to 152,700 barrels per day from 113,000 barrels per day in the fifth quarter of 2012. The company says it remains on track to reach full design capacity of 180,000 barrels per day early in 2014.			
Stage 1	35,000	2004	Operating
Stage 2	35,000	2006	Operating
Cogeneration and Expansion	25,000	2007	Operating
Stage 3	42,500	2011	Operating
Stage 4	42,500	2012	Operating
Stage 5	62,500	2018	Approved
Stage 6	62,500	2019	Approved
Stage 3-6 Debottleneck	23,000	TBD	Application
Lewis			
After the MacKay River expansion and debottlenecking at both Firebag and MacKay River, Lewis is expected to be Suncor's next area of in situ development focus.			
Phase 1	40,000	TBD	Announced
Phase 2	40,000	TBD	Announced
MacKay River			
Suncor says MacKay River production volumes increased to 29,200 barrels per day in the third quarter of 2013 compared to 17,000 barrels per day in the third quarter of 2012, due to maintenance of the central processing facility and the third-party cogeneration unit in the prior-year quarter. The company continues to move toward a 2014 sanction for the MacKay River expansion and in the meantime expects to increase production by approximately 20 per cent over the next two years through debottlenecking.			
Phase 1	33,000	2002	Operating
Debottleneck	5,000	TBD	Construction
MR2	20,000	2017	Application
SUNSHINE OILSANDS LTD.			
Harper			
Carbonate Pilot	1,000	TBD	Operating
Legend Lake			
Sunshine says regulatory approval for the first 10,000-barrel-per-day phase is expected later in 2013. The company is completing field work for its environmental analysis, which will support work for significant commercial expansion.			
Phase A1	10,000	2016	Application
Phase A2	30,000	TBD	Announced
Phase B1	30,000	TBD	Announced
Phase B2	30,000	TBD	Announced
Thickwood			
Sunshine says regulatory approval is anticipated in the third quarter of 2013. The company has filed its proposed terms of reference with Alberta Environment for a phased expansion at Thickwood to approximately 70,000 barrels per day.			
Phase A1	10,000	2015	Approved
Phase A2	30,000	2017	Announced
Phase B	30,000	2021	Announced
West Ells			
Sunshine says that some of the work on the West Ells site has been slowed down temporarily as the company seeks additional funding.			
Phase A1	5,000	2014	Construction
Phase A2	5,000	2014	Approved
Phase A3	30,000	2018	Announced
Phase B	20,000	2025	Announced
Phase C1	30,000	TBD	Announced
Phase C2	30,000	TBD	Announced
SOUTH ATHABASCA REGION — IN SITU			
ALBERTA OILSANDS INC.			
Clearwater West			
Alberta Oilsands has announced its oilsands leases near the Fort McMurray airport will be cancelled, wiping out the company's Clearwater West project.			
Phase 1 Pilot	4,350	TBD	Cancelled
Phase 2	25,000	2016	Cancelled
ATHABASCA OIL CORPORATION			
Hangingstone			
Athabasca says that construction at Hangingstone is nearly full complete and remains on budget and on schedule for first steam in the fourth quarter of 2014.			
Phase 1	12,000	2014	Construction
Phase 2	40,000	2017	Application

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS
Phase 3	35,000	2018	Application
BLACKPEARL RESOURCES INC.			
Blackrod			
BlackPearl says that results from the SAGD pilot continue to meet expectations, and cumulative production from the pilot has reached 200,000 barrels of oil. Steam injection in the second well pair commenced in early November.			
Pilot	800	2011	Operating
Phase 1	20,000	2015	Application
Phase 2	30,000	2018	Application
Phase 3	30,000	2021	Application
CANADIAN NATURAL RESOURCES LIMITED			
Gregoire Lake			
Canadian Natural says Gregoire Lake is in the planning stages.			
Phase 1	60,000	TBD	Announced
Phase 2	60,000	TBD	Announced
Grouse			
Canadian Natural says Grouse is in the planning stages. First production is expected between 2017 and 2019.			
Commercial	50,000	2018	Application
Kirby			
Canadian Natural achieved first steam at Kirby South on September 16 and shipped its first barrel of oil on November 4. Steam is currently being circulated in 28 well pairs on four pads to initiate the SAGD processes. Canadian Natural says the well response is performing as expected and production is targeted to grow to 40,000 barrels per day in the fourth quarter of 2014. All evaporators, steam generators and oil treating vessels are in service, and the first shipment of crude oil produced from commissioning activities was delivered on Nov. 4, 2013.			
KS1 - Kirby South	40,000	2013	Operating
KN1 - Kirby North	40,000	2016	Amended
KN2 - Kirby North	60,000	2019	Application
CAVALIER ENERGY INC.			
Hazle			
Cavalier owner Paramount Resources says front-end engineering and design for Phase 1 continues, along with geotechnical work and drilling of additional source water and disposal wells. The company anticipates regulatory approvals by mid-2014 and continues to evaluate funding alternatives.			
Phase 1	10,000	2017	Application
Phase 2	35,000	TBD	Announced
Phase 3	35,000	TBD	Announced
CENOVUS ENERGY INC.			
Christina Lake			
Cenovus says the Phase F expansion is on schedule and on budget with about 37 per cent of the project complete and procurement, plant construction and engineering work continuing. Engineering work also continues for Phase G.			
Phase 1A	10,000	2002	Operating
Phase 1B	8,800	2008	Operating
Phase C	40,000	2011	Operating
Phase D	40,000	2012	Operating
Phase E	40,000	2013	Operating
Optimization (Phases C, D, E)	21,200	2015	Announced
Phase F	50,000	2016	Construction
Phase G	50,000	2017	Approved
Phase H	50,000	2019	Application
Foster Creek			
Cenovus says Phase F is on schedule and on budget with 85 per cent of the project complete. Phase G is 60 per cent complete, and Phase H is 27 per cent complete.			
Phase A	24,000	2001	Operating
Phase B Debottleneck	6,000	2003	Operating
Phase C Stage 1	10,000	2005	Operating
Phase C Stage 2	20,000	2007	Operating
Phase D	30,000	2009	Operating
Phase E	30,000	2009	Operating
Phase F	45,000	2014	Construction
Phase G	40,000	2015	Construction
Phase H	40,000	2016	Construction
Phase I	50,000	2019	Application
Future Optimization	15,000	TBD	Announced
Grand Rapids			
Cenovus completed a turnaround at Grand Rapids in the third quarter to resolve facility constraints affecting production on both well pairs in the first half of 2013. A regulatory application and EIA for the 180,000-barrel-per-day commercial project has been submitted and Cenovus anticipates receiving regulatory approval within the next few months.			
Pilot	600	2011	Operating
Phase A	60,000	2017	Application
Phase B	60,000	TBD	Application
Phase C	60,000	TBD	Application
Narrows Lake			
Cenovus says plant construction began in August.			
Phase A	45,000	2017	Construction

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS
Phase B	45,000	TBD	Approved
Phase C	40,000	TBD	Approved
West Kirby			
Cenovus says this project remains part of its portfolio of long-term development opportunities.			
Phase 1	30,000	TBD	Announced
Winefred Lake			
Phase 1	30,000	TBD	Announced
CNOOC LIMITED			
Long Lake			
Phase 1	72,000	2008	Operating
Kinosis (K1A)	40,000	TBD	Construction
Kinosis (K1B)	40,000	TBD	Approved
CONNACHER OIL AND GAS LIMITED			
Great Divide			
Connacher says that at Pod 1, positive results are coming from infill wells and four new well pairs are currently steaming. At Algar, rod pump conversions have impacted production. SAGD+ solvent co-injection testing continues. In the third quarter, Connacher shipped 90 per cent of its bitumen by rail.			
Pod One	10,000	2007	Operating
Algar	10,000	2010	Operating
Expansion 1A	12,000	TBD	Approved
Expansion 1B	12,000	TBD	Approved
CONOCOPHILLIPS CANADA			
Surmont			
ConocoPhillips says that on the Surmont 2 expansion, engineering is complete, over 4,000 employees and contractors are on site, and construction is about 60 per cent complete. The company continues to seek buyers for a significant portion of its oilsands leases and operations, including its 50 per cent stake in the Surmont project. The company says this process will extend into 2014.			
Pilot	1,200	1997	Operating
Phase 1	27,000	2007	Operating
Phase 2	109,000	2015	Construction
Phase 3 - Tranche 1	45,000	2020	Announced
Phase 3 - Tranche 2	45,000	TBD	Announced
Phase 3 - Tranche 3	45,000	TBD	Announced
DEVON CANADA CORPORATION			
Jackfish			
Devon says that Jackfish 1 recently produced over 40,000 barrels per day, exceeding nameplate capacity. The Jackfish 3 expansion is 80 per cent complete.			
Phase 1	35,000	2007	Operating
Phase 2	35,000	2011	Operating
Phase 3	35,000	2015	Construction
Jackfish East			
Expansion	20,000	2018	Announced
Pike			
Devon says the Pike project continues to move through the regulatory process.			
1A	35,000	2016	Application
1B	35,000	2017	Application
1C	35,000	2018	Application
GRIZZLY OIL SANDS ULC			
Algar Lake			
Grizzly corporate part-owner Gullport Energy expected first steam at Algar Lake in November 2013, followed by first production and the start of ramp-up in the first quarter of 2014.			
Phase 1	5,500	2014	Construction
Phase 2	5,500	TBD	Approved
May River			
Grizzly corporate part-owner Gullpost Energy says the company continues to work toward filing regulatory applications for a 12,000-barrel-per-day SAGD project at May River by the end of 2013.			
Phase 1	6,800	TBD	Announced
Phase 2	6,800	TBD	Announced
HARVEST OPERATIONS CORP.			
BlackGold			
Harvest says that as of Sept. 30, 2013, the project is about 87 per cent complete and preparing for commissioning and first steam and production. Harvest owner Korea National Oil Corporation is expected to sell its Canadian assets, including BlackGold, in the near term.			
Phase 1	10,000	2014	Construction
Phase 2	20,000	TBD	Application
HUSKY ENERGY INC.			
McMullen			
Husky says that during the third quarter of 2013, 17 wells were drilled and nine wells were completed at the conventional portion of the company's McMullen play with CHOPS production from the first well pad expected by the end of 2013. Completions on the second well pad commenced in the third quarter of 2013 and are expected to be finished in the fourth quarter of 2013. At the air injection pilot, three additional horizontal production wells were tied-in and approval was received from the Alberta Energy Regulator to allow the horizontal wells to be brought onto production.			
Thermal Conduction Pilot	755	2012	Operating
JAPAN CANADA OIL SANDS LIMITED			
Hangingstone			

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS
Construction underway. Enbridge has announced it will construct facilities and provide the project's regional transportation services. The newly constructed pipeline will have capacity of 40,000 barrels per day. First oil from the project is expected in 2016, with initial volumes of 18,000 barrels per day.			
Expansion	20,000	2016	Construction
Hangingstone Pilot			
Pilot	11,000	1999	Operating
KOCH EXPLORATION CANADA CORPORATION			
Muskwa			
Pilot	10,000	2015	Application
LARICINA ENERGY LTD.			
Germain			
Laricina says it converted two well pairs from steam injection to production during the third quarter, and converted a third well pair subsequent to the quarter. The company expects bitumen production from these well pairs in the fourth quarter, as well as to convert additional SAGD well pairs from steam injection to production throughout the fourth quarter and into 2014.			
Phase 1 CDP	5,000	2013	Construction
Phase 2	30,000	2016	Application
Phase 3	60,000	TBD	Application
Phase 4	60,000	TBD	Application
Saleski			
Laricina says that three of four wells were in their respective production cycles of the cyclic-SAGD process during the third quarter, helping to achieve the highest production rates since the pilot began operations in 2011. The construction and start-up schedule for Phase 1 has been delayed while the company seeks additional financing.			
Experimental Pilot	1,800	2011	Operating
Phase 1	10,700	2016	Approved
Phase 2	30,000	2017	Announced
Phase 3	60,000	2020	Announced
Phase 4	60,000	2023	Announced
Phase 5	60,000	2026	Announced
Phase 6	60,000	TBD	Announced
MEG ENERGY CORP.			
Christina Lake			
MEG says that steam injection into Phase 2B well pairs commenced in the third quarter. MEG is also taking advantage of previous integration work to use Phase 2 production to accelerate the commissioning of Phase 2B oil treatment facilities. Phase 2B is currently anticipated to begin first production in the fourth quarter of 2013 and is expected to ramp up to initial design capacity in 2014.			
Phase 1 Pilot	3,000	2008	Operating
Phase 2A	22,000	2009	Operating
Phase 2B	35,000	2013	Construction
Phase 3A	50,000	2016	Approved
Phase 3B	50,000	2018	Approved
Phase 3C	50,000	2020	Approved
Surmont			
MEG says that so far in 2013 a total of 24 stratigraphic wells, one water source well and three water test wells have been completed at Surmont.			
Phase 1	41,000	TBD	Application
Phase 2	41,000	TBD	Application
Phase 3	41,000	TBD	Application
OSUM OIL SANDS CORP.			
Sepiko Kesik			
Osum says it anticipates regulatory approval for Sepiko Kesik in 2014, requiring financing in 2015-16.			
Phase 1	30,000	2018	Application
Phase 2	30,000	2020	Application
STATOIL CANADA LTD.			
Kai Kos Dehseh			
Leismer Demonstration	10,000	2010	Operating
Corner	40,000	2017	Approved
Leismer Commercial	10,000	TBD	Approved
Leismer Expansion	20,000	TBD	Approved
Corner Expansion	40,000	TBD	Application
Hangingstone	20,000	TBD	Application
Leismer Northwest	20,000	TBD	Application
Leismer South	20,000	TBD	Application
Thornbury	40,000	TBD	Application
Thornbury Expansion	20,000	TBD	Application
SUNCOR ENERGY INC.			
Chard			
Phase 1	40,000	TBD	Announced
Meadow Creek			
Phase 1	40,000	TBD	Approved
Phase 2	40,000	TBD	Approved
SURMONT ENERGY LTD.			
Wildwood			
Phase 1	12,000	2015	Application
VALUE CREATION INC.			
Advanced TriStar			
Review of the environmental impact assessment and application for the Advanced TriStar project is underway.			
ATS-1	15,000	2016	Application
ATS-2	30,000	2018	Application
ATS-3	30,000	2020	Application
TriStar			
Value Creation is one of several companies to be impacted by the Alberta government's pending cancellation of oilsands leases around Fort McMurray.			
Pilot	1,000	2014	Application
COLD LAKE REGION — IN SITU			
BAYTEX ENERGY CORP.			
Gemini			
Baytex says the SAGD well pair for its Gemini SAGD pilot was drilled in the third quarter of 2013, and the company remains on track for steaming by early 2014.			
Pilot	1,200	2014	Construction
Commercial	5,000	2016	Approved
BIRCHWOOD RESOURCES INC.			
Sage			
Birchwood has filed its regulatory application for the $230-million Sage project. Propak Systems of Airdrie, Alta., will execute modular surface facility construction.			
Pilot	5,000	2015	Application
CANADIAN NATURAL RESOURCES LIMITED			
Primrose & Wolf Lake			
Canadian Natural says it continues to work with the Alberta Energy Regulator on the causation review of bitumen emulsion seepages identified in spring 2013. The company believes the cause is the mechanical failures of wellbores in the vicinity of the four impacted locations. The company has reviewed all the wellbores in the vicinity of each seepage and has prioritized further work to confirm the mechanical failure, pending regulatory approval for surface access. The steaming plan has been modified, with steaming reduced in some areas.			
Primrose East	32,000	2008	Operating
Primrose North	30,000	2006	Operating
Primrose South	45,000	1985	Operating
Wolf Lake	13,000	1985	Operating
DEVON CANADA CORPORATION			
Walleye			
Devon says the Walleye project has been deferred by a year and will be assessed for inclusion in its 2014 budget.			
Phase 1	9,000	2017	Application
HUSKY ENERGY INC.			
Caribou			
Demonstration	10,000	TBD	Approved
Tucker			
Phase 1	30,000	2006	Operating
IMPERIAL OIL LIMITED			
Cold Lake			
Imperial says that the Nabiye expansion was 59 per cent complete at the end of the third quarter and remains on target for a late 2014 start-up.			
Phases 1-10	110,000	1985	Operating
Phases 11-13	30,000	2002	Operating
Phases 14-16	40,000	2014	Construction
OSUM OIL SANDS CORP.			
Taiga			
Osum says engineering work is underway and some long-lead items have been ordered. Project sanction is expected in 2013. Financing is required.			
Phase 1	23,000	2016	Approved
Phase 2	22,000	2018	Approved
PENGROWTH ENERGY CORPORATION			
Lindbergh			
Pengrowth says that civil construction of the first 12,500-barrel-per-day commercial phase commenced in August, engineering is 90 per cent complete, all major equipment has been ordered and skid fabrication is underway. Mechanical construction of the central processing facility and drilling of 23 additional well pairs to supplement the two well pairs currently producing at the Lindbergh pilot commenced on schedule in September 2013. The project remains on budget and on schedule with first steam from the commercial project expected in the fourth quarter of 2014. Pilot performance continues to show strong results. Pengrowth has issued the proposed terms of reference for the phased 30,000-barrel-per-day expansion.			
Pilot	1,260	2012	Operating
Phase 1	11,240	2015	Construction
Phase 2	17,500	2017	Announced
Phase 3	20,000	2018	Announced

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS
ROYAL DUTCH SHELL PLC			
Orion			
Shell had previously put up for sale its Orion asset, but says it has not received any offers that reflect its value and has ended sale activities.			
Phase 1	10,000	2007	Operating
Phase 2	10,000	TBD	Approved
PEACE RIVER REGION — IN SITU			
ANDORA ENERGY CORPORATION			
Sawn Lake			
Andora majority owner Pan Orient Energy says that final construction and preparation is underway, the first SAGD well pair has been drilled and equipment is ready to install. Steam injection is scheduled for January 2014.			
Demonstration	1,400	2014	Construction
BAYTEX ENERGY CORP.			
Cliffdale			
Commissioning has commenced on Baytex's second cyclic steam stimulation module at Peace River. Steam facility commissioning is expected in the fourth quarter, and cold production is expected to commence imminently.			
Pilot	2,000	2011	Operating
Harmon Valley			
Pilot	TBD	2011	Pending
MURPHY OIL COMPANY LTD.			
Cadotte			
Pilot	TBD	TBD	Suspended
Seal/Cadotte			
Pilot	TBD	TBD	Pending
NORTHERN ALBERTA OIL LTD.			
Sawn Lake			
Company owner Deep Well Oil & Gas says drilling has commenced on the first of two horizontal SAGD wells (one well pair). Remaining 2013 work consists of the the construction of a steam generation facility, water handling and oil treating, along with water source and disposal well facilities. It is anticipated steam operations will commence in December 2013 with first oil production anticipated in the first quarter of 2014.			
Pilot	700	TBD	Approved
PENN WEST PETROLEUM LTD.			
Harmon Valley South			
Penn West has announced that in 2014 it will divest its oilsands assets in the Peace River region of Alberta as part of a strategy to prioritize light oil development. These assets comprise the Peace River Oil Partnership, which was established in 2010 with an affiliate of China Investment Corporation.			
Pilot	TBD	TBD	Construction
Seal Main			
Pilot	75	2011	Operating
Commercial	10,000	2015	Application
PETROBANK ENERGY AND RESOURCES LTD.			
Dawson			
Petrobank has received regulatory approval to initiate two cyclic steam stimulation cycles with each of its THAI production wells. The company is preparing surface facilities for CSS operations and expects to initiate the first three-month steam cycle in late November 2013.			
Experimental THAI Demonstration	10,000	2014	Approved
Phase 2	10,000	TBD	Announced
ROYAL DUTCH SHELL PLC			
Peace River			
Shell has sanctioned the Carmon Creek project, which will be the most significant project ever undertaken in the Peace River region.			
Cadotte Lake	12,500	1986	Operating
Carmon Creek - Phase 1	40,000	2017	Construction
Carmon Creek - Phase 2	40,000	TBD	Announced
SOUTHERN PACIFIC RESOURCE CORP.			
Red Earth			
Southern Pacific says the cyclic steam stimulation pilot at Red Earth is currently shut in.			
Pilot Expansion	3,000	TBD	Announced
Commercial	10,000	TBD	Announced
SASKATCHEWAN REGION — IN SITU			
CENOVUS ENERGY INC.			
Axe Lake			
Cenovus Energy acquired the Axe Lake project in fall 2012. The company has not yet announced plans for the asset, stating only that it is a good "bolt on" addition to the emerging Telephone Lake project, which is adjacent.			
Commercial	30,000	TBD	Announced
NORTH ATHABASCA REGION — UPGRADER			
BP P.L.C.			
Terre de Grace			
BP says that ongoing appraisal activities include delineation drilling, seismic acquisition and appraisal of water sources.			
Pilot	8,400	TBD	Announced
CANADIAN NATURAL RESOURCES LIMITED			
Horizon			
Canadian Natural says that operating performance at Horizon has been strong since the company executed its first major turnaround in May 2013. Horizon SCO production in the third quarter was approximately 112,000 barrels per day. The overall phased expansion to 250,000 barrels per day is 30 per cent physically complete, with the first phase in that expansion, Reliability, 91 per cent physically complete and five per cent under budget.			
Phase 1	110,000	2009	Operating
Reliability - Tranche 2	5,000	2014	Construction
Phase 2A	10,000	2015	Construction
Phase 2B	45,000	2016	Construction
Phase 3	80,000	2017	Construction
IVANHOE ENERGY INC.			
Tamarack			
Ivanhoe Energy has received a letter of non-objection from the Makisew Cree First Nation regarding the Tamarack project. The company says it has now successfully secured letters of non-objection from five of the seven stakeholders that filed statements of concern and continues efforts to resolve the final two statements of concern. Ivanhoe says it anticipates "regulatory clarity" by the end of 2013.			
Phase 1	34,784	2017	Application
SUNCOR ENERGY INC.			
Base Operations			
Suncor says that production was reduced in September as a result of planned maintenance at the Upgrader 2 vacuum tower and related units, which was successfully completed in October. Suncor says this marks the completion of major planned maintenance activities for the year and sets the foundation for a strong fourth quarter.			
U1 and U2	225,000	1967	Operating
Millennium Vacuum Unit	35,000	2005	Operating
Millennium Coker Unit	97,000	2008	Operating
Voyageur Upgrader 3			
Suncor has announced it will not proceed with the Voyageur Upgrader. Total is no longer a partner on the project.			
Phase 1	127,000	2016	Cancelled
Phase 2	63,000	TBD	Cancelled
SYNCRUDE CANADA LTD.			
Mildred Lake/Aurora			
The proposed terms of reference for Syncrude's Mildred Lake Extension (MLX) project are now available for public comment until November 1 here: http://environment.alberta.ca/02313.html.			
Base Plant Stage 1 & 2 Debottleneck	250,000	1978	Operating
Stage 3 Expansion (UE-1)	100,000	2006	Operating
Stage 3 Debottleneck	75,000	TBD	Announced
SOUTH ATHABASCA REGION — UPGRADER			
CNOOC LIMITED			
Long Lake			
Phase 1	58,500	2009	Operating
VALUE CREATION INC.			
Advanced TriStar			
Review of the environmental impact assessment and application for the Advanced TriStar project is underway.			
ATS-1	12,750	2016	Application
ATS-2	25,500	2018	Application
ATS-3	25,500	2020	Application
TriStar			
Value Creation is one of several companies to be impacted by the Alberta government's pending cancellation of oil sands leases around Fort McMurray.			
Pilot	840	2014	Suspended
INDUSTRIAL HEARTLAND REGION — UPGRADER			
NORTH WEST UPGRADING INC.			
Redwater Upgrader			
The partners say that construction activity progress continues at the Sturgeon Refinery site including rough grading, deep undergrounds, foundations and preliminary piling. The metal skin has also been installed for the first non-process building. Engineering and procurement activities continue, with awards for major EPC contracts for various process units targeted to be completed by early 2014.			
Phase 1	50,000	2016	Construction
Phase 2	50,000	TBD	Approved
Phase 3	50,000	TBD	Announced
SHELL ALBIAN SANDS			
Scotford Upgrader 1			
Minority partner Marathon Oil Corporation says the Athabasca Oil Sands Project has recently shown "outstanding" performance due to robust reliability and realizations, but is expecting significant planned downtime in the fourth quarter.			
Commercial	155,000	2003	Operating
Expansion	100,000	2011	Planning
VALUE CREATION INC.			
Heartland			
Reports are that Value Creation could be up and running within 18 months of project sanction, but funding remains unclear.			
Phase 1	46,300	TBD	On Hold
Phase 2	46,300	TBD	Announced
Phase 3	46,300	TBD	Announced

GLOSSARY of oil sands terms

Asphaltenes
The heaviest and most concentrated aromatic hydrocarbon fractions of bitumen.

Barrel
The traditional measurement for crude oil volumes. One barrel equals 42 U.S. gallons (159 litres). There are 6.29 barrels in one cubic metre of oil.

Bitumen
Naturally occurring, viscous mixture of hydrocarbons that contains high levels of sulphur and nitrogen compounds. In its natural state, it is not recoverable at a commercial rate through a well because it is too thick to flow. Bitumen typically makes up about 10 per cent by weight of oil sand, but saturation varies.

Cogeneration
The simultaneous production of electricity and steam, which is part of the operations of many oil sands projects.

Coking
An upgrading/refining process used to convert the heaviest fraction of bitumen into lighter hydrocarbons by rejecting carbon as coke. Coking can be either delayed coking (semi-batch) or fluid coking (continuous).

Condensate
Mixture of extremely light hydrocarbons recoverable from gas reservoirs. Condensate is also referred to as a natural gas liquid, and is used as a diluent to reduce bitumen viscosity for pipeline transportation.

Conventional crude oil
Mixture of mainly pentane and heavier hydrocarbons recoverable at a well from an underground reservoir, and liquid at atmospheric pressure and temperature. Unlike bitumen, it flows through a well without stimulation and through a pipeline without processing or dilution.

Cracking
An upgrading/refining process for converting large, heavy molecules into smaller ones. Cracking processes include fluid cracking and hydrocracking.

Cyclic steam stimulation (CSS)
An in situ production method incorporating cycles of steam injection, steam soaking and oil production. The steam reduces the viscosity of the bitumen and allows it to flow to the production well.

Density
The heaviness of crude oil, indicating the proportion of large, carbon-rich molecules, generally measured in kilograms per cubic metre (kg/m^3) or degrees on the American Petroleum Institute (API) gravity scale; in western Canada, oil up to 900 kg/m^3 is considered light-to-medium crude—oil above this density is deemed as heavy oil or bitumen.

Dilbit
Bitumen that has been reduced in viscosity through addition of a diluent such as condensate or naphtha.

Diluent
A light hydrocarbon blended with bitumen to enable pipeline transport. See *Condensate*.

Extraction
A process, unique to the oil sands industry, that separates the bitumen from the oil sand using hot water, steam and caustic soda.

Froth treatment
The means to recover bitumen from the mixture of water, bitumen and solids "froth" produced in hot-water extraction (in mining-based recovery).

Gasification
A process to partially oxidize any hydrocarbon, typically heavy residues, to a mixture of hydrogen and carbon monoxide. Can be used to produce hydrogen and various energy by-products.

Groundwater
Water accumulations below the Earth's surface that supply fresh water to wells and springs.

Heavy crude oil
Oil with a gravity below 22 degrees API. Heavy crudes must be blended or mixed with condensate to be shipped by pipeline.

Hydrocracking
Refining process for reducing heavy hydrocarbons into lighter fractions, using hydrogen and a catalyst, can also be used in upgrading bitumen.

Hydrotransport
A slurry process that transports water and oil sand through a pipeline to primary separation vessels located in an extraction plant.

Hydrotreater
An upgrading/refining process unit that reduces sulphur and nitrogen levels in crude oil fractions by catalytic addition of hydrogen.

In situ
A Latin phrase meaning "in its original place." In situ recovery refers to various drilling-based methods used to recover deeply buried bitumen deposits.

In situ combustion
An enhanced oil recovery method that works by generating combustion gases (primarily CO and CO_2) downhole, which then "push" the oil towards the recovery well.

Lease
A legal document from the province of Alberta giving an operator the right to extract bitumen from the oil sand existing within the specified lease area. The land must be reclaimed and returned to the Crown at the end of operations.

Light crude oil
Liquid petroleum with a gravity of 28 degrees API or higher. A high-quality light crude oil might have a gravity of about 40 degrees API. Upgraded crude oils from the oil sands run around 30–33 degrees API (compared to 32–34 for Light Arab and 37–40 for West Texas Intermediate).

Mature fine tailings
A gel-like material resulting from the processing of clay fines contained within the oil sands.

Oil sands
Bitumen-soaked sand deposits located in three geographic regions of Alberta: Athabasca, Cold Lake and Peace River. The Athabasca deposit is the largest, encompassing more than 42,340 square kilometres. Total in-place deposits of bitumen in Alberta are estimated at 1.7 trillion to 2.5 trillion barrels.

Overburden
A layer of sand, gravel and shale between the surface and the underlying oil sand in the mineable oil sands region that must be removed before oil sands can be mined.

Permeability
The capacity of a substance (such as rock) to transmit a fluid, such as crude oil, natural gas or water. The degree of permeability depends on the number, size and shape of the pores and/or fractures in the rock and their interconnections. It is measured by the time it takes a fluid of standard viscosity to move a given distance. The unit of permeability is the Darcy.

Petroleum coke
Solid, black hydrocarbon that is left as a residue after the more valuable hydrocarbons have been removed from the bitumen by heating the bitumen to high temperatures.

Primary production
An in situ recovery method that uses natural reservoir energy (such as gas drive, water drive and gravity drainage) to displace hydrocarbons from the reservoir into the wellbore and up to the surface. Primary production uses an artificial lift system in order to reduce the bottomhole pressure or increase the differential pressure to sustain hydrocarbon recovery, since reservoir pressure decreases with production.

Reclamation
Returning disturbed land to a stable, biologically productive state. Reclaimed property is returned to the province of Alberta at the end of operations.

Steam assisted gravity drainage (SAGD)
An in situ production process using two closely spaced horizontal wells, one for steam injection and the other for production of the bitumen/water emulsion.

Surface mining
Operations to recover oil sands by open-pit mining using trucks and shovels. Less than 20 per cent of Alberta's oil sands resources are located close enough to the surface (within 75 metres) for mining to be economic.

Synthetic crude oil
A manufactured crude oil comprised of naphtha, distillate and gas oil-boiling range material. Can range from high-quality, light sweet bottomless crude to heavy, sour blends.

Tailings
A combination of water, sand, silt and fine clay particles that is a by-product of removing the bitumen from the oil sand through the extraction process.

Tailings settling basin
The primary purpose of the tailings settling basin is to serve as a process vessel, allowing time for tailings water to clarify and silt and clay particles to settle so that the water can be reused in extraction. The settling basin also acts as a thickener, preparing mature fine tails for final reclamation.

Thermal recovery
Any in situ process where heat energy (generally steam) is used to reduce the viscosity of bitumen to facilitate recovery.

Upgrading
The process of converting heavy oil or bitumen into synthetic crude either through the removal of carbon (coking) or the addition of hydrogen (hydroconversion).

Viscosity
The ability of a liquid to flow. The lower the viscosity, the more easily the liquid will flow.

CONTACTS

Oil Sands Producers

- **Alberta Oilsands** www.aboilsands.ca
- **Athabasca Oil Corporation** www.athx.com
- **Baytex Energy** www.baytex.ab.ca
- **BlackPearl Resources** www.blackpearlresources.ca
- **Brion Energy Corporation** www.brionenergy.com
- **Canadian Natural Resources** www.cnrl.com
- **Cenovus Energy** www.cenovus.com
- **Chevron Canada** www.chevron.ca
- **CNOOC Limited** www.cnoocltd.com
- **Connacher Oil and Gas** www.connacheroil.com
- **ConocoPhillips Canada** www.conocophillips.ca
- **Devon Canada** www.dvn.com
- **Enerplus Resources Fund** www.enerplus.com
- **E-T Energy** www.e-tenergy.com
- **Grizzly Oil Sands** www.grizzlyoilsands.com
- **Harvest Operations Corp.** www.harvestenergy.ca
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- **North West Upgrading** www.northwestupgrading.com
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- **Osum Oil Sands** www.osumcorp.com
- **Pan Orient Energy** www.panorient.ca
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- **Syncrude** www.syncrude.ca
- **Talisman Energy** www.talisman-energy.com
- **Teck Resources** www.teck.com
- **Total E&P Canada** www.total-ep-canada.com
- **Value Creation Group** www.vctek.com

Associations/Organizations

- **Alberta Chamber of Resources** www.acr-alberta.com
- **Alberta Chambers of Commerce** www.abchamber.ca
- **Alberta Energy** www.energy.gov.ab.ca
- **Alberta Energy Regulator** www.aer.ca
- **Alberta Enterprise and Advanced Education** www.eae.alberta.ca
- **Alberta Environment and Sustainable Resource Development** www.srd.alberta.ca
- **Alberta Innovates** www.albertainnovates.ca
- **Alberta's Industrial Heartland Association** www.industrialheartland.com
- **Building Trades of Alberta** www.buildingtradesalberta.ca
- **Canada's Oil Sands Innovation Alliance** www.cosia.ca
- **Canadian Association of Geophysical Contractors** www.cagc.ca
- **Canadian Association of Petroleum Producers** www.capp.ca
- **Canadian Heavy Oil Association** www.choa.ab.ca
- **In Situ Oil Sands Alliance** www.iosa.ca
- **Lakeland Industry & Community Association** www.lica.ca
- **Natural Resources Conservation Board** www.nrcb.gov.ab.ca
- **Oil Sands Developers Group** www.oilsandsdevelopers.ca
- **Oil Sands Secretariat** www.energy.alberta.ca
- **Petroleum Technology Alliance Canada** www.ptac.org

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